

CLAIMS

What is claimed is:

1. An implantable sphincter stimulator configured for operatively providing electrical stimulation to a surgically implanted innervated smooth muscle sphincter so as to control the flow of a bodily substance therethrough, the stimulator including:
a stimulus generating unit in electrical communication with a receiver, the stimulus generating unit operatively configured to provide a first predetermined electrical stimulation signal adapted to contract said sphincter, and a second predetermined signal adapted to allow said sphincter to relax, one of said predetermined signals being selected in response to a control signal received at the receiver from a remote controller.
2. A sphincter stimulator according to claim 1 wherein the stimulation signal is such as to provide a continuous tone in said sphincter.
3. A sphincter stimulator according to claim 2 wherein the stimulation is pulsatile.
4. A sphincter stimulator according to claim 3 wherein the stimulation signal is generally rectangular and symmetrical biphasic.
5. A sphincter stimulator according to claim 4 wherein the stimulation signal current is less than or equal to 30mA.
6. A sphincter stimulator according to claim 3 wherein the stimulation pulse frequency is in the range of .025 to 2.5Hz.
7. A sphincter stimulator according to claim 3 wherein the stimulation pulse has a width in the range of 0.05 to 0.20 milliseconds.
8. A sphincter stimulator according to claim 1 wherein the control signal is communicated by RF, microwave, optically or magnetically.

9. A sphincter stimulator according to claim 1 wherein the stimulus generating unit includes a demodulator responsive to the received signal for providing a modulated signal to a stimulus encoder which in turn provides a signal to a stimulus driver which provides the stimulation signal at selected ones of the stimulator outputs.
10. A sphincter stimulator according to claim 1 wherein after the sphincter has relaxed, the stimulator includes means to supply the first stimulation signal at a selected one of its outputs to contract the sphincter when a predetermined signal to contract the sphincter is not received by the receiver for a predetermined period.
11. A sphincter stimulator according to claim 1 including a transmitter for transmitting sphincter stimulator telemetry information indicative of one or more parameters of the stimulator for detection remotely.
12. A sphincter stimulator according to claim 11 wherein the information is transmitted by the same communications means as the control signal.
13. A sphincter stimulator according to claim 11 wherein the parameters include one or more of the stimulation signal frequency, current, width and/or shape, or received signal strength or battery status.
14. A sphincter stimulator according to claim 11 wherein the receiver is configured to accept a remotely generated sphincter stimulator calibration signal and in response, the signal processing unit selectively varies one or more of the output properties of the sphincter stimulator.
15. A sphincter stimulator according to claim 14 wherein the calibration signal is transmitted in response to received sphincter stimulator telemetry information.
16. A sphincter stimulator according to claim 1 wherein the stimulation generating unit is operatively connected to the sphincter by one or more electrical leads, each having one or more electrodes.
17. A sphincter stimulator according to claim 16 wherein the lead includes three electrodes disposed in an epimysal configuration about the sphincter.

18. A sphincter stimulator according to claim 16 wherein the lead includes three electrodes disposed in a cuff configuration about the sphincter.
19. A sphincter stimulator according to claim 16 wherein the lead includes three electrodes disposed in a tripolar configuration about the sphincter.